

Notice of Allowability

Application No.

10/010,315

Examiner

Shelly A Chase

Applicant(s)

CORBETT, PETER F.

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 11-13-2001.
2. ☒ The allowed claim(s) is/are 1-30.
3. ☒ The drawings filed on 13 November 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 5-27, 6-13, 6-25
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

DETAILED ACTION

1. Claims 1 to 29 are presented for examination.

Information Disclosure Statement

2. The references listed in the information disclosure statement submitted on 5-27-03, 6-13-03, 6-25-05, and 11-13-01 have been considered by examiner (see attached PTO-1449).

Allowable Subject Matter

3. Claims 1 to 30 are allowed.
4. The following is an examiner's statement of reasons for allowance:

The instant invention calls for a method and an system for organizing and distributing parity blocks among storage devices wherein an extra parity block is added to the block holding a diagonal parity creating an uneven device length. The instant invention also calls for organizing the blocks into strips wherein each strip comprises $(n \times (n-3)) + 1$ blocks.

The prior art made of record teaches various methodologies for distributing and organizing parity in a storage device. For instance, Han et al. (USP 6158017), discloses a method for storing parity of a disk array system wherein the disk array comprises N disks divided into N-1 data blocks storing horizontal parity, diagonal parity and data. The disk also includes an additional or spare block for storing horizontal

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parity and the diagonal parity is distributed across the N disks (see fig. 4). Galbraith et al. (USP 5537567), discloses a storage array with parity block configuration wherein the parity for the storage is computed in a diagonal form and stored according to a specified address in a disk. Edirisooriya (USP 6247157 B1) discloses a method for encoding data signals for storage on a storage medium wherein the storage medium comprises a disk array with row and diagonal parities storage.

However, the prior art made of record, is different from the instant invention in that the prior art made of record taken alone or in combination fails to teach or fairly suggest the novel features or storing an extra parity block to create an uneven device length. Specifically, the prior art made of record fails to teach or fairly suggest or render obvious a method for efficiently organizing and distributing parity blocks among storage devices of an array coupled to a storage system, the method comprising the steps of: appending an extra parity block within each strip to the second device holding the diagonal parity blocks within that stripe, such that an uneven device length arises within the stripe. Claims 2 to 11 are directly or indirectly dependent on claim 1 thus; these claims are allowable over the prior art made of record.

Claims 12, 21 and 25 recite the allowable features of claim 1, thus these claims and their respective dependents are allowed for the same rationale applied to claim 1.

Claim 29:

The prior art made of record teaches dividing the data block using a prime number N, creating $N + 2$ storage units as taught by Edirisooriya or $(N-1) * N$ matrix as taught by Han. However, the prior art made for record fails to teach or fairly suggests a

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method for efficiently organizing and distributing parity blocks among storage devices of an array coupled to a storage system, the method comprising the steps of: organizing the blocks into stripes, wherein each stripe comprises $(N * (N-3)) + 1$ blocks, each storage device containing a pattern of data and parity blocks within a stripe, the parity blocks being one of row and diagonal parity, the storage device containing the diagonal parity is different in each pattern recurrence. Claim 30 is directly dependent on claim 20 and is allowed over the prior art made of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

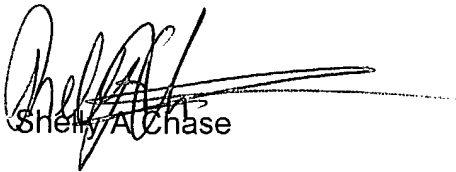
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shelly A Chase whose telephone number is 703-308-7246. The examiner can normally be reached on Mon-Thur from 8:00 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on 703-305-9595. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sherry A. Chase